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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/557,997	04/24/2000	Ganesh Venkataraman	M0656.70055US00	7686

23628 7590 07/20/2007

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EXAMINER	
SMITH, CAROLYN L	
ART UNIT	PAPER NUMBER
1631	
MAIL DATE	DELIVERY MODE
07/20/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/557,997	VENKATARAMAN ET AL.	
	Examiner	Art Unit	
	Carolyn L. Smith	1631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 May 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *36,37 and 54-77* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *36,37 and 54-77* is/are rejected.

7)☒ Claim(s) *74, 76, 77* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicants' submission, filed 5/25/07, has been entered.

Amended claims 36 and 73 and new claims 74-77, filed 5/25/07, are acknowledged.

Claims herein under examination are 36-37 and 54-77.

Claim Objections

Claims 74, 76, and 77 are objected to because of the following informalities:

Claim 74 recites the term "comprises" which should be in the singular form.

Claims 74, 76, and 77 recite the abbreviation "C5" without mentioning what it stands for. Appropriate correction is required.

Claim Rejections - 35 USC § 112, First paragraph

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 75, 76, and 77 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter that was

not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

NEW MATTER

Applicant points to written support for claim amendments on pages 8 (lines 15-27) and 12 (lines 23-33). There does not appear to be adequate written support for limitation "presence or absence of C5 epimerization". While the specification, page 12 (fourth paragraph) states defining units may be modified by C epimerization, this does not provide adequate written support for the presence or absence of C5 epimerization that differs in scope.

Because the introduction of "presence or absence of C5 epimerization" does not appear to have adequate written support in the claims, specification, and/or drawings, as originally filed, this limitation is NEW MATTER.

Claims Rejected Under 35 U.S.C. § 112, Second Paragraph

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 36-37 and 54-77 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention.

Claim 36 (line 10) recites the limitation "the monosaccharide or disaccharide" which lacks clear antecedent basis. While there is previous mention of plural "monosaccharides or

disaccharides", there is no previous mention of a singular "monosaccharide or disaccharide". It is unclear to which particular monosaccharide or disaccharide the limitation is referring from the previous plurality mentioned. Clarification of this issue via clearer claim wording is requested. Claims 37 and 54-72 are also rejected due to their dependency from claim 36.

Claims 36 (lines 15 and 17) and 73 (lines 12 and 14) recite the limitation "the values" which lacks clear antecedent basis. Claim 36 recites one or more fields with each field storing a value. This implies that there are one or more values. It is unclear if Applicant intends to exclude the scenario of there being one value (from one field) from the limitation "the values" on line 15. A similar situation arises with the limitation on line 17 of claim 36 as well as claim 73. Clarification of this issue via clearer claim wording is requested. Claims 37, 54-72, and 74-77 are also rejected due to their dependency from claims 36 and 73.

Claims 36 (line 18) and 73 (line 15) recite the limitation "using" which is vague and indefinite. It is unclear what step or steps are encompassed by this limitation. Clarification of this issue via clearer claim wording is requested. Claims 37, 54-72, and 74-77 are also rejected due to their dependency from claims 36 and 73.

Claim 58 recites the phrase "may be" which is vague and indefinite. It is unclear whether "may be" is a positive limitation or not. Clarification of this issue via clearer claim wording is requested.

Claim 61 (line 1) recites the limitation "the value" which lacks clear antecedent basis. Claim 36, from which claim 61 depends, recites "value" and "one or more values". It is unclear if Applicant intends to exclude the scenario of there being plural values from the limitation "one or more values" as stated in instant claim 36. Clarification of this issue via clearer claim

wording is requested. Claims 62-59 and 74 are also rejected due to their dependency from claim 61.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 36-37, 54-64, and 66-72 are rejected under 35 U.S.C. 102(b) as being anticipated by van Kuik et al. (Carbohydrate Research, Volume 235, 1992, pages 53-68).

Van Kuik et al. disclose a method for determining partial and complete matches between the carbohydrate structures of a query sequence and a polysaccharide via a database computer program (abstract) including monosaccharides and lactose-type chain (i.e. of disaccharide with Gal-Glc sequence) (page 54, third and last paragraph), as stated in instant claims 36, 59, and 60. Van Kuik et al. disclose the database program runs on IBM compatible personal computers using MS-DOS (page 54, third paragraph). Table I shows a database record in ASCII format comprising a sequence listing with an identifier (H#) and various fields of value information including PPM values. Table II (A) shows a query sequence listing with a first data structure in the input screen of the program including an identifier (i.e. N on line 3) in a field with PPM values for the query sequence which represents a first data structure tangibly embodied in a computer readable medium. Table II (B) shows the program's output screen of a polysaccharide,

which is not a nucleic acid, represented by a second data structure tangibly embodied on a computer readable medium including an identifier (S#: N-0A02-003860) that includes fields storing values (i.e. PPM values) for the monosaccharide residues, as well as Van Kuik et al. disclose preparing oligosaccharides involving sulfosalicylic acid, 1% sodium dodecyl sulfate, and 73 U of peptide-N-(N-acetyl-β-D-glucosaminyl)-asparagine amidase F which represents properties comprising the nature and degree of sulfation or acetylation (page 57, second paragraph), as stated in instant claim 36. Van Kuik et al. disclose searching the database for structure matches with a user-defined profile of structures (page 57, first paragraph) as well as the "Start Search" button on the Input screen (Table II (A)) which represents a user providing input for one or more fields of the first data structure with an input device, as stated in step (A) of instant claim 36. Van Kuik et al. disclose adding residue constraints to the search profile as well as searching and counting only relevant residues inside a tolerance limit (page 55, last line and page 57, lines 1-5) which represents generating at least one mask with the values stored in one or more fields of the first data structure, as stated in step (B) of instant claim 36. Van Kuik et al. disclose using "AND", "OR", or "NOT" operations with the hit lists wherein the hit list search took place within the tolerance limit, combining searches (page 57, first paragraph), as well as using "N"s on hit structures (Table IV) and output results (Table II(B) and Table IV) which represent performing at least one binary operation, such as "AND", on the values stored in the one or more fields of the second data structure using at least one mask to generate at least one result (as stated in instant claims 36 and 71) as well as combining results with an "OR" operation to generate at least one result (as stated in instant claim 72). Van Kuik et al. disclose results with matching structural elements highlighted (abstract, Tables II (B) and IV) which represents

determining whether the monosaccharides or dissacharides of the query sequence match the monosaccharides or dissacharides of the polysaccharide with at least one result, as stated in step (D) of instant claim 36. Van Kuik et al. disclose the program and database require 3.5 Mbytes of disc space and Table II shows fields of data structures wherein each field represents a bit (unit of information storage) field, as stated in instant claim 37. Table II shows numerical PPM values which represent non-character based fields, as stated in instant claim 54. Van Kuik et al. disclose a query sequence as "Structure I" (page 62) and a polysaccharide result example as "N-0A02-003860" (Table II (B)) which represent numerical identifiers, as stated in instant claim 55. Van Kuik et al. disclose the monosaccharides of the query sequence (page 62) and polysaccharide sequence (Table IV) from numbers 1 to 8 which identify the constituents in the carbohydrate chains (Figure 2 caption, page 62) which represent single digit hexadecimal identifier numbers, as stated in instant claim 56. Table II lists PPM values with decimal values and Table IV lists fraction codes which represent decimal value identifiers which may be reduced to a plurality of prime divisors (i.e. one and three for N2.1 of page 64), as stated in instant claims 57 and 58. Van Kuik et al. disclose PPM values of the monosaccharides in the polysaccharide sequence (Table II) which represent NMR properties of the monosaccharides in the polysaccharide sequence, as stated in instant claim 61. Tables II (B) shows the identity of the polysaccharide as well as its monosaccharides and their associated PPM values which represent the identity and exact chemical structure of the polysaccharide, as stated in instant claims 62, 63, and 68. Van Kuik et al. disclose fraction N2 contained compounds with two negative charges (page 59, first paragraph) which represent properties comprising the charge, as stated in instant claim 64. Van Kuik et al. disclose preparing oligosaccharides involving sulfosalicylic acid, 1%

sodium dodecyl sulfate, and 73 U of peptide-N-(N-acetyl-β-D-glucosaminyl)-asparagine amidase F which represents properties comprising the nature and degree of sulfation and acetylation (page 57, second paragraph), as stated in instant claims 66 and 67. Van Kuik et al. disclose percent match results of the hit structures (polysaccharides) with the query sequence (Table IV, column 6 from left) which represents the act of determining step with a result that has a non-zero value, as stated in instant claim 69. Table I contains PPM values for GlcNAc (acetylglucosamine) which is a monosaccharide of a heparin-like glycosaminoglycan, as stated in instant claim 70. Van Kuik et al. disclose analyzing carbohydrate fractions prepared from a pool of horse serum glycoproteins (abstract and page 57, second paragraph).

Thus, Van Kuik et al. anticipate claims 36-37, 54-64, and 66-72.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any

evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 65 is rejected under 35 U.S.C. 103(a) as being unpatentable over van Kuik et al. (Carbohydrate Research, Volume 235, 1992, pages 53-68) as applied to claims 36-37, 54-64, and 66-72 above, and further in view of Van Kuik et al. (Trends in Biotechnology, Volume 10, 1992, pages 182-185).

Van Kuik et al. (A) (1992, Carbohydrate Research) describe the limitations of claims 36-37, 54-64, and 66-72 (see above). Van Kuik et al. (A) (1992, Carbohydrate Research) do not describe properties comprising the molecular weight of the monosaccharide or disaccharide of the polysaccharide (instant claim 65).

Van Kuik et al. (B) (1992, Trends in Biotechnology) describe using databases of complex carbohydrates to search for carbohydrate structures (title and page 183, col. 1, third paragraph). Van Kuik et al. (B) describe searching monosaccharides and all resides attached to it (page 183, col. 1, fourth paragraph) which encompasses the search of monosaccharides, disaccharides, and other oligosaccharides. Van Kuik et al. (B) describe searches can be made for other items including molecular formula and molecular weight (page 183, col. 2, first paragraph) which represents properties comprising molecular weight, as stated in instant claim 65.

Van Kuik et al. (B) state review articles provide easy access to data but cover only selected parts of NMR data which is neither corrected or updated which is why it is a good idea to store NMR tables in a computer database and develop a program for easy manipulation of the

data (page 184, col. 2, second paragraph). Van Kuik et al. (B) state as the number of published tables grows exponentially, a computerized approach of data storage and retrieval is essential (page 185, col. 1, fourth paragraph). It would have been obvious to the person of ordinary skill in the art at the time the invention was made to modify the method of van Kuik et al. via searching other items, such as molecular weight, as stated by Van Kuik et al. (B) (page 183, col. 2, first paragraph) along with structure search of carbohydrates, as stated by Van Kuik et al. (A) (abstract) and (B) (page 183, col. 1, last paragraph) in order to narrow the search as stated by Van Kuik et al. (B) (page 183, col. 1, last paragraph). The person of ordinary skill in the art would have been motivated to make this modification because the CCSD database is growing rapidly and if the hits are too large to browse through, then supplementary searches can be made to narrow the number of branches or monosaccharide residues or put other constraints by using different search profiles, as stated by Van Kuik et al. (B) (page 183, col. 1, last paragraph and col. 2, third paragraph). One would have expected success in combining these limitations as both van Kuik et al. references deal with the same database program involving ^{1}H NMR (Van Kuik et al. (A) abstract) and (B) (page 184, col. 2, second paragraph).

Thus, Van Kuik et al. (A) in view of Van Kuik et al. (B) make obvious claims 36-37 and 54-72.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 73-77 are rejected under 35 U.S.C. 103(a) as being unpatentable over van Kuik et al. (A) (Carbohydrate Research, Volume 235, 1992, pages 53-68) and Van Kuik et al. (B) (Trends in Biotechnology, Volume 10, 1992, pages 182-185), as applied to claims 36-37 and 54-72 above, and further in view of Hook et al. (Biochem. Journal, Volume 137, 1974, pages 33-43) and Bohne et al. (Journal of Molecular Modeling, Volume 4, 1998, pages 33-43).

Van Kuik et al. describe a method for determining partial and complete matches between the carbohydrate structures of a query sequence and a polysaccharide via a database computer program (abstract) including monosaccharides and lactose-type chain (i.e. of disaccharide with Gal-Glc sequence) (page 54, third and last paragraph), as stated in instant claims 36, 59, and 60. Van Kuik et al. describe the database program runs on IBM compatible personal computers

using MS-DOS (page 54, third paragraph). Table I shows a database record in ASCII format comprising a sequence listing with an identifier (H#) and various fields of value information including PPM values. Table II (A) shows a query sequence listing with a first data structure in the input screen of the program including an identifier (i.e. N on line 3) in a field with PPM values for the query sequence which represents a first data structure tangibly embodied in a computer readable medium. Table II (B) shows the program's output screen of a polysaccharide, which is not a nucleic acid, represented by a second data structure tangibly embodied on a computer readable medium including an identifier (S#: N-0A02-003860) that includes fields storing values (i.e. PPM values) for the monosaccharide residues, as well as Van Kuik et al. describe preparing oligosaccharides involving sulfosalicylic acid, 1% sodium dodecyl sulfate, and 73 U of peptide-N-(N-acetyl-β-D-glucosaminyl)-asparagine amidase F which represents properties comprising the nature and degree of sulfation or acetylation (page 57, second paragraph), as stated in instant claim 36. Van Kuik et al. describe searching the database for structure matches with a user-defined profile of structures (page 57, first paragraph) as well as the "Start Search" button on the Input screen (Table II (A)) which represents a user providing input for one or more fields of the first data structure with an input device, as stated in step (A) of instant claim 36. Van Kuik et al. describe adding residue constraints to the search profile as well as searching and counting only relevant residues inside a tolerance limit (page 55, last line and page 57, lines 1-5) which represents generating at least one mask with the values stored in one or more fields of the first data structure, as stated in step (B) of instant claim 36. Van Kuik et al. describe using "AND", "OR", or "NOT" operations with the hit lists wherein the hit list search took place within the tolerance limit, combining searches (page 57, first paragraph), as

well as using "N"s on hit structures (Table IV) and output results (Table II(B) and Table IV) which represent performing at least one binary operation, such as "AND", on the values stored in the one or more fields of the second data structure using at least one mask to generate at least one result (as stated in instant claims 36 and 71) as well as combining results with an "OR" operation to generate at least one result (as stated in instant claim 72). Van Kuik et al. describe results with matching structural elements highlighted (abstract, Tables II (B) and IV) which represents determining whether the monosaccharides or dissacharides of the query sequence match the monosaccharides or dissacharides of the polysaccharide with at least one result, as stated in step (D) of instant claim 36. Van Kuik et al. describe the program and database require 3.5 Mbytes of disc space and Table II shows fields of data structures wherein each field represents a bit (unit of information storage) field, as stated in instant claim 37. Table II shows numerical PPM values which represent non-character based fields, as stated in instant claim 54. Van Kuik et al. describe a query sequence as "Structure I" (page 62) and a polysaccharide result example as "N-0A02-003860" (Table II (B)) which represent numerical identifiers, as stated in instant claim 55. Van Kuik et al. describe the monosaccharides of the query sequence (page 62) and polysaccharide sequence (Table IV) from numbers 1 to 8 which identify the constituents in the carbohydrate chains (Figure 2 caption, page 62) which represent single digit hexadecimal identifier numbers, as stated in instant claim 56. Table II lists PPM values with decimal values and Table IV lists fraction codes which represent decimal value identifiers which may be reduced to a plurality of prime divisors (i.e. one and three for N2.1 of page 64), as stated in instant claims 57 and 58. Van Kuik et al. describe PPM values of the monosaccharides in the polysaccharide sequence (Table II) which represent NMR properties of the monosaccharides in

the polysaccharide sequence, as stated in instant claim 61. Tables II (B) shows the identity of the polysaccharide as well as its monosaccharides and their associated PPM values which represent the identity and exact chemical structure of the polysaccharide, as stated in instant claims 62, 63, and 68. Van Kuik et al. describe fraction N2 contained compounds with two negative charges (page 59, first paragraph) which represent properties comprising the charge, as stated in instant claim 64. Van Kuik et al. describe preparing oligosaccharides involving sulfosalicylic acid, 1% sodium dodecyl sulfate, and 73 U of peptide-N-(N-acetyl-β-D-glucosaminyl)-asparagine amidase F which represents properties comprising the nature and degree of sulfation and acetylation (page 57, second paragraph), as stated in instant claims 66 and 67. Van Kuik et al. describe percent match results of the hit structures (polysaccharides) with the query sequence (Table IV, column 6 from left) which represents the act of determining step with a result that has a non-zero value, as stated in instant claim 69. Table I contains PPM values for GlcNAc (acetylglucosamine) which is a monosaccharide of a heparin-like glycosaminoglycan, as stated in instant claim 70. Van Kuik et al. describe analyzing carbohydrate fractions prepared from a pool of horse serum glycoproteins (abstract and page 57, second paragraph). Van Kuik et al. do not describe properties comprising the molecular weight of the monosaccharide or disaccharide of the polysaccharide (instant claim 65) and a disaccharide of a heparin-like glycosaminoglycan or properties comprising the presence or absence of C5 epimerization (claims 73-77).

Van Kuik et al. (B) (1992, Trends in Biotechnology) describe using databases of complex carbohydrates to search for carbohydrate structures (title and page 183, col. 1, third paragraph). Van Kuik et al. (B) describe searching monosaccharides and all resides attached to it (page 183, col. 1, fourth paragraph) which encompasses the search of monosaccharides, disaccharides, and

other oligosaccharides. Van Kuik et al. (B) describe searches can be made for other items including molecular formula and molecular weight (page 183, col. 2, first paragraph) which represents properties comprising molecular weight, as stated in instant claim 65. Van Kuik et al. (B) do not describe matching a disaccharide of a query sequence to a reference disaccharide, a disaccharide of a heparin-like glycosaminoglycan or properties comprising the presence or absence of C5 epimerization (claims 73-77).

Bohne et al. describe a software tool SWEET for analyzing sequence information of complex carbohydrates (abstract). Bohne et al. describe inputting disaccharide strings (page 35, col. 2, last paragraph), obtaining values of each disaccharide, including Galβ(1-2)Galβ, (Figures 4a and 4b and their captions; page 38, last paragraph of col. 1 to first paragraph of col. 2), comparing (matching) query disaccharides with reference disaccharides (Table 1 with identifiers including values and page 42, col. 1, last paragraph), and output modes (Figure 7 and page 40, Output section) including a user generating sequence information and results sent back via email (page 42, col. 1, third paragraph). Bohne et al. describe using databases (page 42, col. 2, second paragraph) and data collections where the sequence of complex carbohydrates is stored, including CarbBank which contains sequences of all types of saccharides (page 34, col. 1, first paragraph). Bohne et al. describe values in Table I of disaccharides containing GalNAc and GlcNAc which represent a monosaccharide of a heparin-like glycosaminoglycan, as stated in instant claim 70. Bohne et al. do not describe a disaccharide of a heparin-like glycosaminoglycan or properties comprising the presence or absence of C5 epimerization (claims 73-77).

Hook et al. describe determining compositions of heparin-like glycosaminoglycans (HLGAG), including values for disaccharides of HLGAG (abstract and Table 2). Hook et al. describe C-5 epimerization of glucuronic acid units as well as the nature and degree of sulfation (abstract; page 40, col. 1, last paragraph). Hook et al. describe N-acetylated and N-sulfated glucoamine residues (page 40, col. 2, last paragraph).

Van Kuik et al. (B) state review articles provide easy access to data but cover only selected parts of NMR data which is neither corrected or updated which is why it is a good idea to store NMR tables in a computer database and develop a program for easy manipulation of the data (page 184, col. 2, second paragraph). Van Kuik et al. (B) state as the number of published tables grows exponentially, a computerized approach of data storage and retrieval is essential (page 185, col. 1, fourth paragraph).

It would have been obvious to the person of ordinary skill in the art at the time the invention was made to modify the method of van Kuik et al. via searching other items, such as molecular weight, as stated by Van Kuik et al. (B) (page 183, col. 2, first paragraph) along with structure search of carbohydrates, as stated by Van Kuik et al. (A) (abstract) and (B) (page 183, col. 1, last paragraph) in order to narrow the search as stated by Van Kuik et al. (B) (page 183, col. 1, last paragraph). The person of ordinary skill in the art would have been motivated to make this modification because the CCSD database is growing rapidly and if the hits are too large to browse through, then supplementary searches can be made to narrow the number of branches or monosaccharide residues or put other constraints by using different search profiles, as stated by Van Kuik et al. (B) (page 183, col. 1, last paragraph and col. 2, third paragraph). One would have expected success in combining these limitations as both van Kuik et al.

references deal with the same database program involving ^{1}H NMR (Van Kuik et al. (A) abstract) and (B) (page 184, col. 2, second paragraph).

It would have been further obvious to a person of ordinary skill in the art at the time the invention was made to modify the carbohydrate structure matching methods of van Kuik et al. (A) and (B) with the program SWEET involving disaccharide subunits of Bohne et al. where the motivation would have been to assist all glycoscientists dealing with structural and conformational aspects of oligo- and polysaccharides via easy accessible and searchable interfaces, as taught by Bohne et al. (page 42, col. 2, third paragraph and page 35, col. 1, second paragraph). One would have expected success in combining these limitations as Bohne et al. state that SWEET can visualize and analyze structures and then submit them to other more comprehensive computational methods as it can be accessed worldwide by a standard interface using many different hardware platforms (page 42, col. 2, third paragraph).

It would have been further obvious to a person of ordinary skill in the art at the time the invention was made to modify the carbohydrate structure matching methods of van Kuik et al. (A) and (B) and Bohne et al. with heparin-like glycosaminoglycan as taught by Hook et al. where the motivation would have been to rapidly convert commonly used sequence information and combine experimental and computational results, as stated by Bohne et al. (page 34, col. 2, second paragraph). One would have expected success in combining these limitations since heparin-like glycosaminoglycan is a saccharide and Bohne et al. state that SWEET can visualize and analyze structures in databases (page 42, col. 2, second and third paragraph) and data collections where the sequence of complex carbohydrates is stored, including CarbBank which contains sequences of all types of saccharides (page 34, col. 1, first paragraph).

Thus, Van Kuik et al. (A) in view of Bohne et al., Van Kuik et al. (B), and Hook et al. make obvious the instant invention.

Applicant argues that none of the references cited by the Examiner alone or in combination teach or make obvious a value that corresponds to the nature and degree of sulfation or acetylation or the use of such a value to compare monosaccharides or disaccharides of a polysaccharide. The Examiner argues that van Kuik et al. teach preparing oligosaccharides involving sulfosalicylic acid, 1% sodium dodecyl sulfate and 73 U of peptide-N-(N-acetyl-13-D-glucosaminyl)-asparagine amidase F and that this teaching represents properties comprising the nature and degree of sulfation and acetylation as stated in instant claims 66 and 67. Applicant argues van Kuik et al. merely provide how the oligosaccharides used in the van Kuik et al. method were obtained. This statement is found unpersuasive as van Kuik et al. disclose methods of obtaining oligosaccharides (involving sulfation and acetylation) as well as values for the oligosaccharides. Therefore, any values corresponding to the oligosaccharides inherently correspond to the nature and degree of sulfation and acetylation. Applicant has used broad claim language (i.e. corresponding), so the claims have been interpreted broadly and reasonably. It is also noted that Hook et al. describe C-5 epimerization of glucuronic acid units as well as the nature and degree of sulfation (abstract; page 40, col. 1, last paragraph). Hook et al. describe N-acetylated and N-sulfated glucoamine residues (page 40, col. 2, last paragraph).

Applicant argues that none of the references alone or in combination teach or make obvious methods for determining whether a disaccharide of a query sequence matches a

disaccharide of a heparin-like glycosaminoglycan as well values corresponding to properties of monosaccharides or disaccharides of heparin-like glycosaminoglycans or that such values can be used to compare monosaccharides or disaccharides of a query sequence with monosaccharides or disaccharides of a heparin-like glycosaminoglycan. It is noted that another prior art reference (Hook et al.) has been added to address this limitation. It is noted that a reference disclosing a disaccharide (i.e. GlcNAc linked to GlcA) that is found in a heparin-like glycosaminoglycan broadly and reasonably represents a "disaccharide of a heparin-like glycosaminoglycan" even if the polymer that contains the disaccharide is not an actual heparin-like glycosaminoglycan. Applicant argues that Bohne et al. merely provide for methods of determining the three-dimensional structure of known carbohydrates that is very different from and not at all related to methods of determining whether monosaccharides or disaccharides of a query sequence match those of a known sequence. This statement is found unpersuasive as this is a 35 USC 103 rejection such that not all the limitations must come from a single reference. Applicant argues the Examiner has not adequately established that one of ordinary skill in the art would have combined the very disparate teachings of the cited references or why one would do so or demonstrated a reasonable expectation of success in obtaining Applicant's claimed methods. This statement is found unpersuasive as statements of motivation to combine and a reasonable expectation of success have been provided and Applicant has failed to provide sound evidence or reasoning as to why these statements would be considered improper.

Applicant argues that they have amended claims 36 and 73 and reiterate the above arguments. This statement is found unpersuasive as the above arguments were not persuasive for the reasons stated above.

The prior art "The Complex Carbohydrate Structure Database" (Doubet et al.) has been made of record and not relied upon; however, it is considered pertinent to applicant's disclosure.

Conclusion

No claim is allowed.

Papers related to this application may be submitted to Technical Center 1600 by facsimile transmission. Papers should be faxed to Technical Center 1600 via the PTO Fax Center. The faxing of such papers must conform to the notices published in the Official Gazette, 1096 OG 30 (November 15, 1988), 1156 OG 61 (November 16, 1993), and 1157 OG 94 (December 28, 1993) (See 37 CFR §1.6(d)). The Central Fax Center number for official correspondence is (571) 273-8300.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carolyn Smith, whose telephone number is (571) 272-0721. The examiner can normally be reached Monday through Thursday from 8 A.M. to 6:30 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ram Shukla, can be reached on (571) 272-0735.

July 16, 2007

/Carolyn Smith/
Primary Examiner
AU 1631